August 25, 2015

FILED

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PUBLIC UTILITIES COMMISSION

The Honorable Chair and Members
of the Hawai'i Public Utilities Commission
Kekuanaoa Building, 1st Floor
465 South King Street
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Docket No. 2011-0206
Reliability Standards Working Group
Monthly Report

Pursuant to Ordering Paragraph 3 of the Commission's Order No. 30371, filed on May 4, 2012, in the above subject proceeding, enclosed as Exhibit A is the Hawaiian Electric Companies'[1] monthly report for July 2015 on (1) system frequency control performance during month; (2) significant system events during month; and (3) curtailment of non-dispatchable renewable resources.

In addition, an electronic copy of each report is also included with this filing. These files are voluminous, and therefore, the Company is providing a compact disc ("CD") containing the electronic files to both the Commission and the Consumer Advocate. Copies of the CD will be available to any Party to this proceeding. Interested Parties should email Marisa Chun at marisa.chun@heco.com to request a copy.

If you have any questions on this matter, please contact Marisa Chun at (808) 543-4723.

Sincerely,

Daniel G. Brown
Manager
Regulatory Non-Rate Proceedings

Enclosure

cc: Service List

[1] Hawaiian Electric Company, Inc., Hawai'i Electric Light Company, Inc., and Maui Electric Company, Limited are collectively referred to as the "Hawaiian Electric Companies" or "Companies".

SERVICE LIST
(Docket No. 2011-0206)

JEFFREY T. ONO EXECUTIVE DIRECTOR DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS DIVISION OF CONSUMER ADVOCACY P.O. Box 541 Honolulu, HI 96809	2 Copies Via Hand Delivery
GREGG J. KINKLEY, ESQ. DEPARTMENT OF THE ATTORNEY GENERAL 425 Queen Street Honolulu, Hawaii 96813 Counsel for DBEDT	1 Copy Electronically Transmitted
DANIEL W.S. LAWRENCE, ESQ. DEPARTMENT OF THE CORPORATION COUNSEL CITY AND COUNTY OF HONOLULU 530 S. King Street, Room 110 Honolulu, HI 96813 Counsel for the CITY AND COUNTY OF HONOLULU	1 Copy Electronically Transmitted
MOLLY A. STEBBINS, ESQ. WILLIAM V. BRILHANTE, JR., ESQ. DEPARTMENT OF THE CORPORATION COUNSEL COUNTY OF HAWAII 101 Aupuni Street, Suite 325 Hilo, HI 96720 Counsel for the COUNTY OF HAWAII	1 Copy Electronically Transmitted
HENRY Q CURTIS VICE PRESIDENT FOR CONSUMER ISSUES LIFE OF THE LAND P.O. Box 37158 Honolulu, HI 96837-0158	1 Copy Electronically Transmitted
WARREN S. BOLLMEIER II PRESIDENT HAWAII RENEWABLE ENERGY ALLIANCE 46-040 Konane Place, #3816 Kaneohe, HI 96744	1 Copy Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

DOUGLAS A. CODIGA, ESQ.
SCHLACK ITO LLLC
Topa Financial Center
745 Fort Street, Suite 1500
Honolulu, HI 96813
Counsel for BLUE PLANET FOUNDATION

1 Copy
Electronically Transmitted

ISAAC MORIWAKE, ESQ.
DAVID HENKIN, ESQ.
EARTHJUSTICE
850 Richards Street, Suite 400
Honolulu, HI 96813-4501
Counsel for HAWAII SOLAR ENERGY ASSOCIATION

1 Copy
Electronically Transmitted

KENT D. MORIHARA, ESQ.
KRIS N. NAKAGAWA, ESQ.
LAUREN M. IMADA-LEE, ESQ.
TANYA M. FERNANDES, ESQ.
Morihara Lau & Fong LLP
841 Bishop Street, Suite 400
Honolulu, Hawaii 96813
Counsel for KAUAI ISLAND UTILITY COOPERATIVE

1 Copy
Electronically Transmitted

ERIK W. KVAM
CHIEF EXECUTIVE OFFICER
ZERO EMISSIONS LEASING LLC
1110 University Avenue, Suite 402
Honolulu, HI 96826

1 Copy
Electronically Transmitted

SANDRA-ANN Y.H. WONG, ESQ.
ATTORNEY AT LAW, A LAW CORPORATION
1050 Bishop Street, #514
Honolulu, HI 96813
Counsel for TAWHIRI POWER LLC

1 Copy
Electronically Transmitted

RILEY SAITO
73-1294 Awakea Street
Kailua-Kona, HI 96740
For SOLAR ENERGY INDUSTRIES ASSOCIATION

1 Copy
Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

DEAN T. YAMAMOTO, ESQ.
YAMAMOTO & SETTLE
700 Bishop Street, Suite 200
Honolulu, HI 96813
Counsel for CASTLE & COOKE HOMES HAWAII, INC.,
CASTLE & COOKE RESORTS, LLC and
LANAI SUSTAINABILITY RESEARCH, LLC

1 Copy
Electronically Transmitted

MICHAEL J. HOPPER, ESQ.
DEPUTY CORPORATION COUNSEL
DEPARTMENT OF THE CORPORATION COUNSEL
COUNTY OF MAUI
200 S. High Street
Wailuku, HI 96793
Counsel for the COUNTY OF MAUI

1 Copy
Electronically Transmitted

CURTIS SEYMOUR
SENIOR MANAGER, GOVERNMENT AFFAIRS
SUN EDISON LLC
600 Clipper Drive
Belmont, CA 94002

1 Copy
Electronically Transmitted

MONA W. CLARK, ESQ.
OFFICE OF THE COUNTY ATTORNEY
COUNTY OF KAUAI
4444 Rice Street, Suite 200
Lihue, HI 96766-1300

1 Copy
Electronically Transmitted

BRADLEY ALBERT
PRESIDENT
HAWAII PV COALITION
P.O. Box 81501
Haiku, HI 96708

1 Copy
Electronically Transmitted

HILTON H. UNEMORI
ECM, INC.
130 N. Market Street
Wailuku, HI 96793-1716
For SOUTH MAUI RENEWABLE RESOURCES, LLC

1 Copy
Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

SKY STANFIELD
KEYES, FOX & WIEDMAN LLP
436 14th Street, Suite 1305
Oakland, CA 94612
For the INTERSTATE RENEWABLE ENERGY COUNCIL

1 Copy
Electronically Transmitted

PETE COOPER
SOLARCITY CORPORATION
REGIONAL DIRECTOR, HAWAII
599 Kahelu Street
Mililani, HI 96789

1 Copy
Electronically Transmitted

STANLEY ALLEN GRAY, SENIOR DEVELOPER
Pier 1, Bay 3
San Francisco, CA 94111
For MOLOKAI RENEWABLES LLC

1 Copy
Electronically Transmitted

ALISON SILVERSTEIN
19213 Luedtke Lane
Pflugerville, TX 78660

1 Copy
Electronically Transmitted

BRENDAN KIRBY
12011 SW Pineapple Court
Palm City, FL 34990

1 Copy
Electronically Transmitted

The Commission's Order No. 30371 (Docket No 2011-0206 – Relating To Various Matters in RSWG Process), filed May 4, 2012, ordered the following information for each island grid:

(1) System frequency control performance during month:
   a) Frequency duration plot based on the highest resolution SCADA data available for the month detailing how many seconds each power system operated at frequencies above 60 hertz and at frequencies below 60 Hz.
   b) Tabulation of the number, magnitude and duration of frequency excursions (high and low) outside normal frequency control range (59.95 to 60.05 Hz).

The following provides information with respect to items 1a) through 1b) – (all statements are current as of the month ending July 31, 2015):

1a) Frequency duration plot based on the highest resolution SCADA data available for the month detailing how many seconds each power system operated at frequencies above 60 hertz and at frequencies below 60 Hz:

The frequency duration plots for Hawaiian Electric, Maui Electric (Maui Division) and Hawai'i Electric Light based on two-second data are provided in Attachment 1, and the enclosed Excel files. Refer to the electronic files for the individual data points because the information is voluminous and does not translate well to a hard copy.

1b) Tabulation of the number, magnitude and duration of frequency excursions (high and low) outside normal frequency control range (59.95 to 60.05 Hz):

Tabulation of the number, magnitude and duration of frequency excursions outside of the frequency range of 59.95 Hz to 60.05 Hz for Hawaiian Electric, Maui Electric (Maui Division) and Hawai'i Electric Light are provided in Attachment 2, and the enclosed Excel files. Refer to the electronic files for the individual data points because the information is voluminous and does not translate well to a hard copy.

(2) Significant system events during month:
   a) Tabulation of contingency reserve activations including date and time, MW magnitude, duration, and triggering event.
   b) Tabulation of under frequency load shed activations including date and time, triggering frequency, MW magnitude, duration, and triggering event.
   c) Tabulation of demand response activations for system events, including date and time, MW magnitude, duration, and triggering event, (excluding demand response utilization for unit commitment deferral or system operations economics.)

The following provides information with respect to items 2a) through 2c) – (all statements are current as of the month ending July 31, 2015):

2a) Tabulation of contingency reserve activations including date and time, MW magnitude, duration, and triggering event:

Hawaiian Electric's contingency reserve activations are provided in Attachment 3.
Maui Electric and Hawai'i Electric Light do not operate with contingency reserve requirements.

2b) Tabulation of under frequency load shed activations including date and time, triggering frequency, MW magnitude, duration, and triggering event:

Hawaiian Electric, Maui Electric, and Hawai'i Electric Light's under frequency load shed events are provided in Attachment 4.

2c) Tabulation of demand response activations for system events, including date and time, MW magnitude, duration, and triggering event, (excluding demand response utilization for unit commitment deferral or system operations economics.)

Hawaiian Electric's demand response activations for system events are provided in Attachment 5. Hawai'i Electric Light currently does not have demand response program. Maui Electric has implemented the Fast Demand Response pilot program on a limited basis. Hawai'i Electric Light plans to use the findings of Maui Electric's pilot program to help in the evaluation and development of future demand response programs. Maui Electric executes a weekly testing protocol which measures customer participation. This program is not currently used in response to actual system events.

(3) Curtailment of non-dispatchable renewable resources:
   (a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment.
   (b) Total MWh of non-dispatchable renewable resources curtailed for the month.

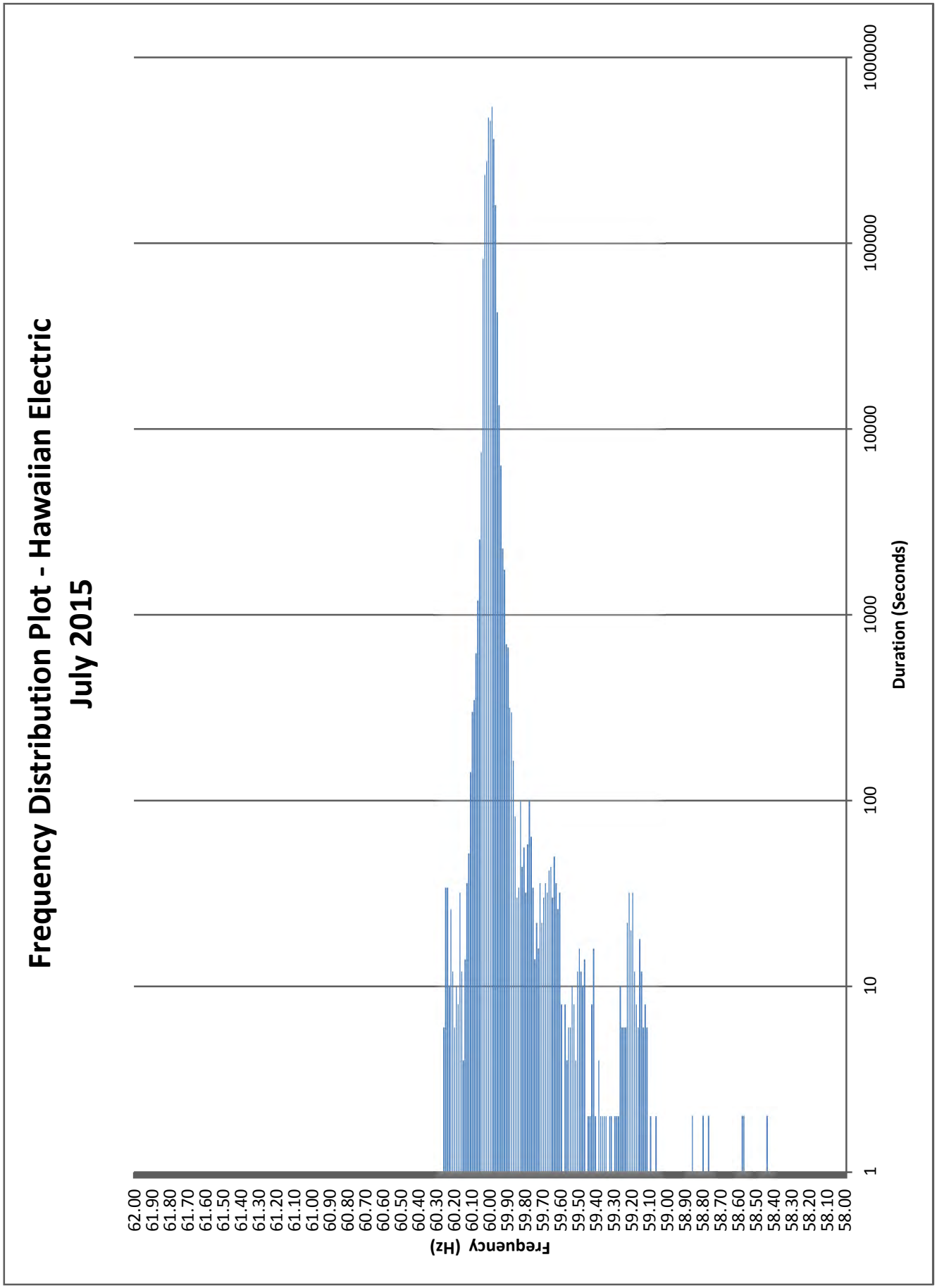
The following provides information with respect to items 3a) through 3b) – (all statements are current as of the month ending July 31, 2015):

3a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment:

The tabulation of each curtailment event for each resource is provided in Attachment 6.

3b) Total MWh of non-dispatchable renewable resources curtailed for the month:

Curtailed MWH from non-dispatchable resources are difficult to determine due to the variability of the resource during curtailment periods. In some cases, the curtailed MWH estimates were provided by the IPPs under curtailment. The Hawaiian Electric Companies do not make any representations as to the accuracy of the curtailed MWH. The estimated MWH of non-dispatchable resources curtailed for the month are provided in Attachment 6, corresponding to each curtailment event.


Frequency Distribution Plot - Hawaiian Electric
July 2015
Duration (Seconds)
1000000
100000
10000
1000
100
10
1
Frequency (Hz)
62.00
61.90
61.80
61.70
61.60
61.50
61.40
61.30
61.20
61.10
61.00
60.90
60.80
60.70
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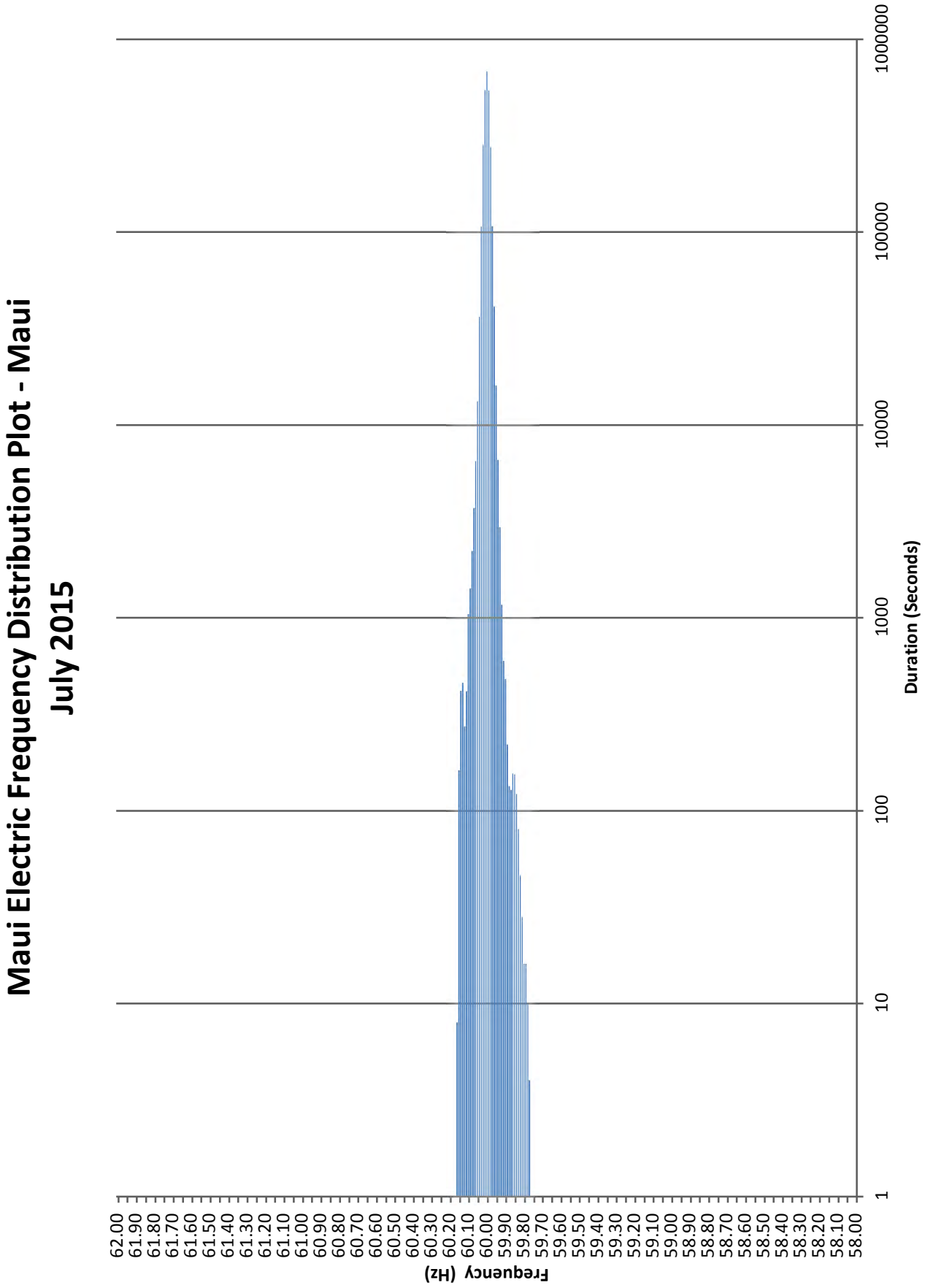
Maui Electric Frequency Distribution Plot - Maui
July 2015
Duration (Seconds)
1000000
100000
10000
1000
100
10
1
Frequency (Hz)
62.00
61.90
61.80
61.70
61.60
61.50
61.40
61.30
61.20
61.10
61.00
60.90
60.80
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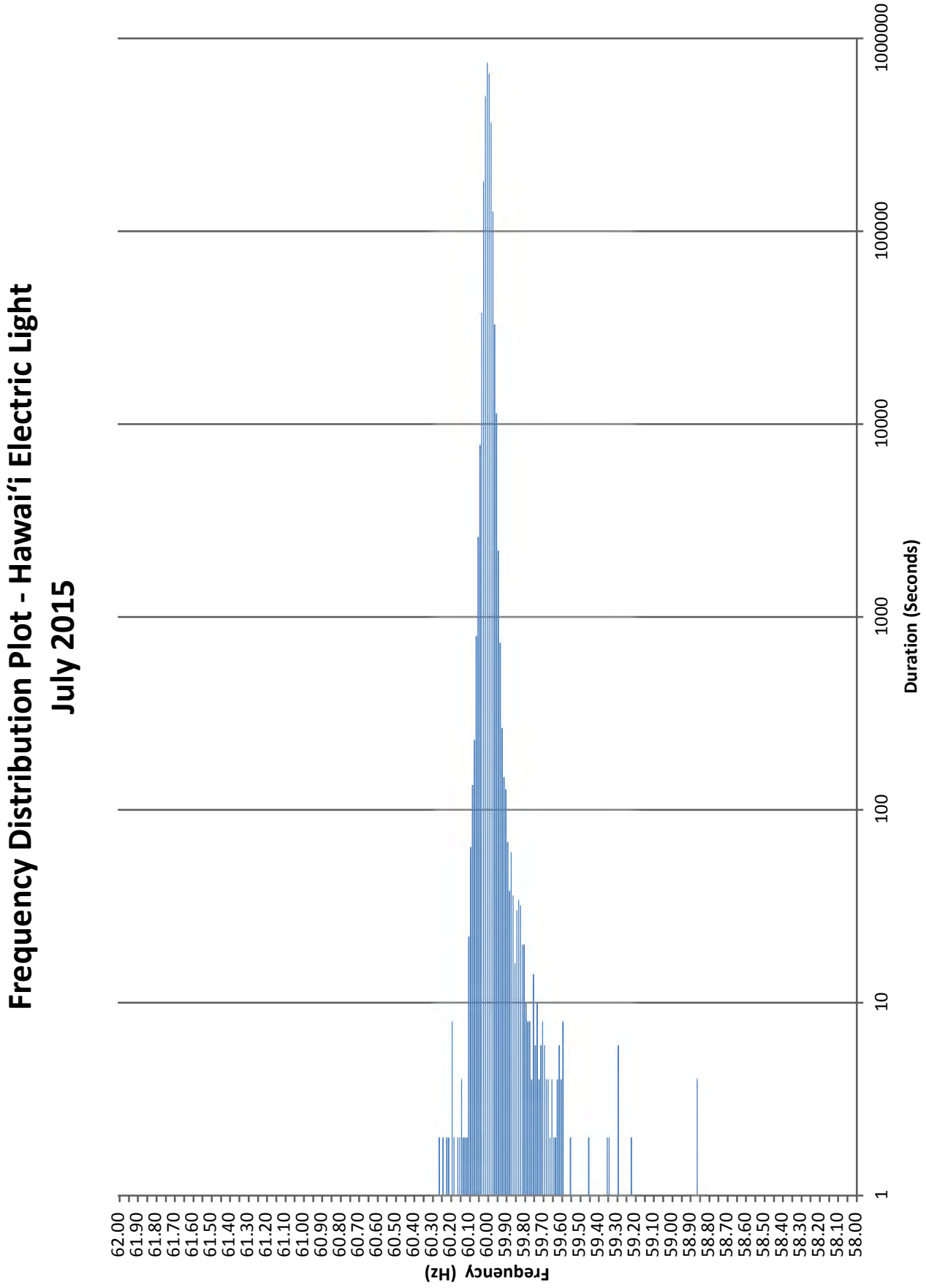
58.10
58.00


Frequency Distribution Plot - Hawai'i Electric Light
July 2015
Duration (Seconds)
1
10
100
1000
10000
100000
1000000
Frequency (Hz)
62.00
61.90
61.80
61.70
61.60
61.50
61.40
61.30
61.20
61.10
61.00
60.90
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58.50
58.40
58.30
58.20
58.10
58.00

Hawaiian Electric Frequency Excursion Statistics July 2015		
Data Rounded to the nearest	<59.95 Hz	>60.05 Hz
Number of Excursions	924	415
Maximum Duration (sec)	1194	712
Maximum Deviation (Hz)	58.441	60.256
Total Duration of Excursions (sec)	18510	7404

Maui Electric Frequency Excursion Statistics July 2015		
	<59.95 Hz	>60.05 Hz
Number of Excursions	3352	2507
Maximum Duration (sec)	1370	1828
Maximum Deviation (Hz)	59.7661	60.1604
Total Duration of Excursions (sec)	19078	21616

Hawai'i Electric Light Frequency Excursion Statistics June 2015		
	<59.95 Hz	>60.05 Hz
Number of Excursions	1385	448
Maximum Duration (sec)	472	150
Maximum Deviation (Hz)	58.856	60.263
Total Duration of Excursions (sec)	9450	2292

HAWAIIAN ELECTRIC COMPANY, INC.
CONTINGENCY RESERVE ACTIVATION EVENTS
JULY 2015

Event #	Date & Time	Frequency (Hz)			Spinning Reserve Shortfall (MW)	Duration (HH:MM)	Description
		Prior to Event	Nadir	Trigger			
1	07/22/15 11:22	59.985	58.439	NA	-53.00	0:17	AES tripped offline while generating ~180 MW. W10 and CIP brought online for spinning reserve.
2	07/23/15 11:21	59.976	58.540	NA	-18.00	0:15	AES tripped offline while generating ~179 MW. W10 and CIP brought online for spinning reserve.
3	07/23/15 11:25	59.760	59.098	NA	-105.00	0:15	K4 tripped offline while generating ~68 MW.

HAWAIIAN ELECTRIC COMPANY, INC.
UNDERFREQUENCY LOAD SHEDDING EVENTS
JULY 2015

Event #	Date & Time	Frequency (Hz)			Load Shed (MW)	Duration (HH:MM)	Description
		Prior to Event	Nadir	Trigger			
1	07/22/15 11:22	59.985	58.439	59.00	83	0:06	AES tripped offline while generating ~180 MW. Kicker Block 1, Block 1 and Block 2 were activated.
2	07/23/15 11:21	59.976	58.540	59.00	86	0:02	AES tripped offline while generating ~179 MW. Kicker Block 1, Block 1 and Block 2 were activated.

MAUI ELECTRIC COMPANY, LIMITED
UNDERFREQUENCY LOAD SHEDDING EVENTS
JULY 2015

				Frequency (Hz)					
Event #	IR #	Island	Date & Time	Prior to Event	Nadir	Levels UFLS Occurred	Load Shed (MW)	Duration (HH:MM)	Description
1	668	Lānaʻi	7/1/2015 4:36 PM	59.97	54.66	58.65, 58.00, 57.5, 57.00	1.95	1:09	A frequency depression of 54.66 Hz occurred on Lānaʻi when LL8 tripped off line due to a loss of field protective relay trip.
2	679	Lānaʻi	7/9/2015 5:02 AM	59.96	58.27	58.65	0.23	0:08	A frequency depression of 58.27 Hz occurred on Lānaʻi when LL3 tripped off line.

HAWAII ELECTRIC LIGHT COMPANY, INC.
UNDERFREQUENCY LOAD SHEDDING EVENTS
JULY 2015

Event #	Date	Time	Frequency (Hz) Prior to Event	Frequency (Hz) Nadir	Frequency (Hz) Level UFLS Occurred	Load Shed (MW)	Duration (HH:MM)	Description
1	7/23/2015	2:54 PM	59.98	58.78	58.80	14.30	00:06	Keahole CT-5 tripped offline

HAWAIIAN ELECTRIC COMPANY, INC.
DEMAND RESPONSE EVENTS
JULY 2015

Event #	Date & Time	Frequency (Hz)			Load Shed (MW)	Duration (HH:MM)	Description
		Prior to Event	Nadir	Trigger			
1	07/22/15 11:22	59.985	58.439	59.70	NA	0:14	AES tripped offline while generating ~180 MW. CIDLC and RDLC were activated.
2	07/23/15 11:21	59.976	58.540	59.70	NA	0:15	AES tripped offline while generating ~179 MW. CIDLC and RDLC were activated.

Hawaiian Electric Curtailment Report July 2015

Start Date/Time	Curtailment Set Point	MW output prior to start of curtailment	End Date/Time	MW output after curtailment released	Estimated MWh of curtailed energy during event (1)	IPP	Reason for Curtailment
07/14/15 17:31	0.0	9.70	07/14/15 18:09	0	*	KWF	Maintenance work
07/14/15 17:32	0.0	2.40	07/14/15 18:10	0	*	Makai	Maintenance work
07/28/15 10:02	0.0	15.70	07/28/15 12:15	0	*	Mauka	Maintenance work

KLS2 = Kalaeloa Solar 2 PV Farm
KREP = Kalaeloa Renewable Energy Park
KWF = Kahuku Wind Farm
Makai = Kawailoa Makai Wind Farm
Mauka = Kawailoa Mauka Wind Farm
(1) The estimated MWh of energy curtailed during the event is supplied by Kahuku Wind Farm and/or Kawailoa Wind Farm, and HECO does not make any representations as to its accuracy.
* Data has not been provided by IPP.

Maui Electric

Maui Curtailment Report July 2015

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
7/4/2015 1:33	0:01	KWP	0.000	0.010	AGC MAVG - calculated
7/4/2015 20:17	0:01	KWP	0.000	0.019	AGC MAVG - calculated
7/5/2015 1:35	0:07	KWPII	0.128	16.855	AGC MAVG - calculated
7/5/2015 1:45	0:09	KWPII	0.604	16.850	AGC MAVG - calculated
7/5/2015 1:58	0:02	KWPII	0.032	16.338	AGC MAVG - calculated
7/5/2015 2:08	0:01	KWPII	0.035	14.388	AGC MAVG - calculated
7/5/2015 2:25	0:01	KWPII	0.003	14.368	AGC MAVG - calculated
7/5/2015 2:29	1:49	KWPII	10.426	20.468	AGC MAVG - calculated
7/5/2015 4:19	0:01	KWPII	0.000	19.900	AGC MAVG - calculated
7/5/2015 4:54	0:01	KWPII	0.010	16.451	AGC MAVG - calculated
7/5/2015 4:57	0:06	KWPII	0.094	18.838	AGC MAVG - calculated
7/5/2015 5:05	0:01	KWPII	0.018	17.353	AGC MAVG - calculated
7/5/2015 9:17	0:01	KWPII	0.008	18.640	AGC MAVG - calculated
7/5/2015 9:53	0:02	KWPII	0.038	16.612	AGC MAVG - calculated
7/5/2015 9:57	0:03	KWPII	0.061	18.278	AGC MAVG - calculated
7/5/2015 10:19	0:01	KWPII	0.010	16.621	AGC MAVG - calculated
7/5/2015 10:23	0:02	KWPII	0.032	19.073	AGC MAVG - calculated
7/5/2015 10:29	0:01	KWPII	0.019	17.487	AGC MAVG - calculated
7/5/2015 23:05	0:02	KWPII	0.015	18.020	AGC MAVG - calculated
7/5/2015 23:08	0:01	KWPII	0.012	17.801	AGC MAVG - calculated
7/5/2015 23:19	0:27	KWPII	1.349	20.191	AGC MAVG - calculated
7/5/2015 23:59	0:10	KWPII	0.159	20.346	AGC MAVG - calculated
7/6/2015 0:12	0:01	KWPII	0.007	20.098	AGC MAVG - calculated
7/6/2015 0:16	0:01	KWPII	0.003	19.914	AGC MAVG - calculated
7/6/2015 0:18	0:02	KWPII	0.009	19.885	AGC MAVG - calculated
7/6/2015 0:21	0:01	KWPII	0.002	19.625	AGC MAVG - calculated
7/6/2015 0:28	0:01	KWPII	0.010	19.578	AGC MAVG - calculated
7/6/2015 0:32	2:56	KWPII	12.785	20.552	AGC MAVG - calculated
7/6/2015 3:29	0:12	KWPII	0.441	17.385	AGC MAVG - calculated
7/6/2015 3:42	0:06	KWPII	0.269	15.729	AGC MAVG - calculated
7/6/2015 3:49	0:02	KWPII	0.041	13.026	AGC MAVG - calculated
7/6/2015 4:06	1:16	KWPII	10.005	20.494	AGC MAVG - calculated
7/6/2015 5:23	0:16	KWPII	0.310	20.428	AGC MAVG - calculated
7/6/2015 5:41	0:01	KWPII	0.009	20.398	AGC MAVG - calculated
7/6/2015 5:43	0:01	KWPII	0.001	20.134	AGC MAVG - calculated
7/6/2015 5:48	0:03	KWPII	0.012	20.119	AGC MAVG - calculated
7/6/2015 6:01	0:01	AWE	0.000	0.037	AGC MAVG - calculated
7/6/2015 6:02	0:07	KWPII	0.064	20.429	AGC MAVG - calculated
7/6/2015 6:10	0:22	KWPII	0.437	20.643	AGC MAVG - calculated
7/6/2015 9:44	0:02	KWPII	0.006	20.668	AGC MAVG - calculated
7/6/2015 9:52	0:40	KWPII	2.819	20.703	AGC MAVG - calculated
7/6/2015 10:40	0:01	KWPII	0.004	20.373	AGC MAVG - calculated
7/6/2015 10:54	0:01	KWPII	0.002	20.681	AGC MAVG - calculated
7/6/2015 11:16	0:26	KWPII	1.288	20.706	AGC MAVG - calculated
7/6/2015 11:46	0:14	KWPII	0.657	20.269	AGC MAVG - calculated
7/6/2015 12:03	0:01	KWPII	0.006	19.819	AGC MAVG - calculated
7/6/2015 12:05	1:13	KWPII	3.811	20.476	AGC MAVG - calculated
7/6/2015 13:20	0:01	KWPII	0.002	17.958	AGC MAVG - calculated
7/6/2015 13:22	0:03	KWPII	0.021	18.234	AGC MAVG - calculated
7/6/2015 13:29	0:01	KWPII	0.006	17.955	AGC MAVG - calculated
7/6/2015 13:32	0:02	KWPII	0.028	19.996	AGC MAVG - calculated
7/6/2015 13:35	0:01	KWPII	0.000	20.252	AGC MAVG - calculated
7/6/2015 13:38	0:07	KWPII	0.206	20.182	AGC MAVG - calculated
7/6/2015 13:49	0:01	KWPII	0.015	19.132	AGC MAVG - calculated
7/6/2015 13:51	0:01	KWPII	0.008	18.210	AGC MAVG - calculated
7/6/2015 13:55	0:01	KWPII	0.002	17.588	AGC MAVG - calculated
7/6/2015 13:58	0:02	KWPII	0.030	18.221	AGC MAVG - calculated
7/6/2015 14:02	0:01	KWPII	0.009	19.158	AGC MAVG - calculated
7/6/2015 14:08	0:01	KWPII	0.000	19.972	AGC MAVG - calculated
7/6/2015 14:10	0:02	KWPII	0.019	20.303	AGC MAVG - calculated
7/6/2015 14:14	0:01	KWPII	0.005	19.930	AGC MAVG - calculated
7/6/2015 14:18	0:04	KWPII	0.038	20.622	AGC MAVG - calculated
7/6/2015 14:26	0:15	KWPII	0.537	20.638	AGC MAVG - calculated
7/6/2015 14:54	0:01	KWPII	0.001	20.577	AGC MAVG - calculated
7/6/2015 16:25	0:02	KWPII	0.011	20.618	AGC MAVG - calculated
7/6/2015 20:10	0:12	KWPII	0.953	20.705	AGC MAVG - calculated
7/6/2015 23:38	0:01	AWE	0.117	7.000	AGC MAVG - entered - Maintaining Regulating Reserves
7/6/2015 23:39	2:45	KWPII	34.980	20.708	AGC MAVG - entered - Maintaining Regulating Reserves and AGC MAVG - calculated
7/7/2015 0:10	0:01	AWE	0.019	18.137	AGC MAVG - calculated
7/7/2015 1:19	0:01	AWE	0.013	14.700	AGC MAVG - calculated
7/7/2015 1:22	0:55	AWE	3.539	18.550	AGC MAVG - calculated
7/7/2015 2:18	0:01	AWE	0.006	10.113	AGC MAVG - calculated
7/7/2015 2:26	0:22	KWPII	4.964	16.217	AGC MAVG - calculated
7/7/2015 2:37	0:04	AWE	0.046	9.620	AGC MAVG - calculated
7/7/2015 2:50	1:18	KWPII	13.733	16.210	AGC MAVG - calculated
7/7/2015 3:48	0:14	AWE	0.915	15.697	AGC MAVG - calculated
7/7/2015 4:10	1:01	KWPII	6.256	15.829	AGC MAVG - calculated
7/7/2015 5:25	0:01	KWPII	0.009	15.660	AGC MAVG - calculated
7/7/2015 5:35	0:10	KWPII	0.264	15.728	AGC MAVG - calculated
7/7/2015 5:46	0:02	KWPII	0.021	14.056	AGC MAVG - calculated
7/7/2015 7:52	0:26	KWPII	1.629	16.840	AGC MAVG - calculated
7/7/2015 8:26	0:07	KWPII	0.470	15.853	AGC MAVG - calculated
7/7/2015 8:34	0:21	KWPII	2.015	17.581	AGC MAVG - calculated
7/7/2015 8:57	0:04	KWPII	0.068	17.594	AGC MAVG - calculated
7/7/2015 9:03	0:01	KWPII	0.012	17.592	AGC MAVG - calculated
7/7/2015 9:15	0:23	KWPII	1.042	19.120	AGC MAVG - calculated
7/7/2015 10:18	0:04	KWPII	0.077	18.277	AGC MAVG - calculated and Testing
7/7/2015 10:24	0:01	KWPII	0.014	17.410	Testing
7/7/2015 10:53	0:04	KWPII	0.038	20.549	AGC MAVG - calculated
7/7/2015 11:41	0:02	KWPII	0.014	19.975	AGC MAVG - calculated
7/7/2015 11:48	0:03	KWPII	0.026	20.111	AGC MAVG - calculated
7/7/2015 11:52	0:01	KWPII	0.003	19.906	AGC MAVG - calculated
7/7/2015 12:11	0:09	KWPII	0.210	20.548	AGC MAVG - calculated
7/7/2015 12:21	0:07	KWPII	0.237	20.314	AGC MAVG - calculated
7/7/2015 12:41	0:04	KWPII	0.024	20.107	AGC MAVG - calculated
7/7/2015 12:48	0:17	KWPII	0.847	20.528	AGC MAVG - calculated
7/7/2015 13:08	0:01	KWPII	0.002	18.423	AGC MAVG - calculated
7/7/2015 13:11	0:01	KWPII	0.005	19.006	AGC MAVG - calculated
7/7/2015 13:15	0:14	KWPII	0.400	20.300	AGC MAVG - calculated
7/7/2015 13:31	0:36	KWPII	2.251	20.499	AGC MAVG - calculated
7/7/2015 14:08	0:02	KWPII	0.039	18.237	AGC MAVG - calculated
7/7/2015 14:16	0:07	KWPII	0.154	19.142	AGC MAVG - calculated
7/7/2015 15:54	0:01	KWPII	0.004	19.772	AGC MAVG - calculated
7/7/2015 16:38	0:02	KWPII	0.016	20.007	AGC MAVG - calculated
7/7/2015 16:41	0:05	KWPII	0.076	20.619	AGC MAVG - calculated
7/7/2015 17:07	0:06	KWPII	0.081	20.700	AGC MAVG - calculated
7/7/2015 17:22	0:09	KWPII	0.185	20.694	AGC MAVG - calculated
7/7/2015 21:56	0:04	KWPII	0.049	20.387	AGC MAVG - calculated
7/7/2015 22:42	0:02	KWPII	0.012	20.301	AGC MAVG - calculated
7/7/2015 23:33	3:42	KWPII	43.285	20.708	AGC MAVG - calculated
7/8/2015 2:04	0:03	AWE	0.046	15.650	AGC MAVG - calculated
7/8/2015 3:03	0:01	AWE	0.001	15.010	AGC MAVG - calculated
7/8/2015 3:09	0:01	AWE	0.011	14.940	AGC MAVG - calculated
7/8/2015 3:17	0:42	KWPII	12.769	20.708	AGC MAVG - calculated

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Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
7/8/2015 3:36	0:19	AWE	1.792	21.000	AGC MAVG - calculated
7/8/2015 4:01	1:33	KWPII	9.916	19.211	AGC MAVG - calculated
7/8/2015 6:57	1:20	KWPII	4.198	19.211	AGC MAVG - calculated and Testing
7/8/2015 8:51	0:01	KWPII	0.008	19.211	AGC MAVG - calculated and Testing
7/8/2015 9:01	0:07	KWPII	0.057	19.211	AGC MAVG - calculated and Testing
7/8/2015 9:09	0:06	KWPII	0.088	19.211	AGC MAVG - calculated and Testing
7/8/2015 9:19	0:06	KWPII	0.165	19.211	AGC MAVG - calculated and Testing
7/8/2015 9:34	2:44	KWPII	21.313	20.708	AGC MAVG - calculated and Testing
7/8/2015 12:21	0:18	KWPII	0.957	20.706	AGC MAVG - calculated and Testing
7/8/2015 15:15	0:01	KWPII	0.007	20.708	AGC MAVG - calculated and Testing
7/8/2015 15:54	0:08	KWPII	0.174	20.708	AGC MAVG - calculated and Testing
7/8/2015 16:04	0:02	KWPII	0.007	20.708	AGC MAVG - calculated and Testing
7/8/2015 16:09	0:06	KWPII	0.080	20.708	AGC MAVG - calculated and Testing
7/8/2015 16:49	0:01	KWPII	0.001	20.708	AGC MAVG - calculated and Testing
7/8/2015 18:02	0:01	KWPII	0.002	20.707	AGC MAVG - calculated and Testing
7/8/2015 18:04	0:01	KWPII	0.002	20.704	AGC MAVG - calculated and Testing
7/9/2015 0:08	0:19	KWPII	0.556	20.708	AGC MAVG - calculated
7/9/2015 0:59	4:48	KWPII	25.063	20.708	AGC MAVG - calculated
7/9/2015 23:13	0:04	KWPII	0.043	20.111	AGC MAVG - calculated
7/9/2015 23:54	0:06	KWPII	0.077	20.698	AGC MAVG - calculated
7/10/2015 0:02	0:59	KWPII	3.558	20.698	AGC MAVG - calculated
7/10/2015 1:02	2:23	KWPII	17.007	20.501	AGC MAVG - calculated
7/10/2015 4:05	0:58	KWPII	5.243	20.519	AGC MAVG - calculated
7/10/2015 5:38	0:01	KWPII	0.002	20.437	AGC MAVG - calculated
7/10/2015 5:40	0:13	KWPII	0.152	20.402	AGC MAVG - calculated
7/10/2015 5:54	0:05	KWPII	0.018	19.862	AGC MAVG - calculated
7/10/2015 6:14	0:47	KWPII	1.406	20.708	AGC MAVG - calculated
7/10/2015 7:22	0:04	KWPII	0.010	20.646	AGC MAVG - calculated
7/10/2015 7:30	0:08	KWPII	0.072	20.698	AGC MAVG - calculated
7/10/2015 7:49	0:02	KWPII	0.004	20.703	AGC MAVG - calculated
7/10/2015 7:52	0:07	KWPII	0.094	20.698	AGC MAVG - calculated
7/10/2015 8:16	1:35	KWPII	5.420	20.708	AGC MAVG - calculated
7/10/2015 9:54	0:27	KWPII	2.688	20.708	AGC MAVG - calculated
7/10/2015 10:22	0:55	KWPII	3.495	20.708	AGC MAVG - calculated
7/10/2015 11:18	0:03	KWPII	0.019	20.705	AGC MAVG - calculated
7/10/2015 11:24	0:04	KWPII	0.023	20.693	AGC MAVG - calculated
7/10/2015 11:30	0:01	KWPII	0.000	20.701	AGC MAVG - calculated
7/10/2015 11:32	2:05	KWPII	9.693	20.708	AGC MAVG - calculated and Testing
7/11/2015 1:08	0:09	KWPII	0.271	20.489	AGC MAVG - calculated
7/11/2015 1:18	0:04	KWPII	0.171	20.540	AGC MAVG - calculated
7/11/2015 9:44	0:01	AWE	0.000	0.007	AGC MAVG - calculated
7/11/2015 12:14	0:01	KWP	0.000	0.005	AGC MAVG - calculated
7/11/2015 13:55	0:01	AWE	0.000	0.003	AGC MAVG - calculated
7/11/2015 14:02	0:01	AWE	0.000	0.003	AGC MAVG - calculated
7/12/2015 16:29	0:01	KWP	0.000	0.002	AGC MAVG - calculated
7/12/2015 16:53	0:01	KWP	0.000	0.017	AGC MAVG - calculated
7/12/2015 19:32	0:39	KWPII	2.978	20.480	AGC MAVG - calculated
7/13/2015 2:26	0:02	KWPII	0.049	6.139	AGC MAVG - calculated
7/13/2015 3:24	0:01	KWPII	0.021	9.734	AGC MAVG - calculated
7/13/2015 3:26	0:02	KWPII	0.111	11.659	AGC MAVG - calculated
7/13/2015 3:29	0:33	KWPII	7.715	17.404	AGC MAVG - entered - Maintaining Regulating Reserves
7/13/2015 3:38	0:19	AWE	1.622	20.570	AGC MAVG - entered - Maintaining Regulating Reserves
7/13/2015 4:05	0:01	KWPII	0.008	15.791	AGC MAVG - calculated
7/13/2015 4:17	0:05	KWPII	0.153	16.062	AGC MAVG - calculated
7/13/2015 4:23	0:07	KWPII	0.213	17.150	AGC MAVG - calculated
7/13/2015 4:50	0:02	KWPII	0.031	18.771	AGC MAVG - calculated
7/13/2015 4:54	0:24	KWPII	1.121	19.178	AGC MAVG - calculated
7/13/2015 5:20	1:01	KWPII	7.002	19.149	AGC MAVG - calculated
7/13/2015 6:25	0:02	KWPII	0.016	19.176	AGC MAVG - calculated
7/13/2015 6:28	0:01	KWPII	0.002	19.164	AGC MAVG - calculated
7/13/2015 6:39	0:01	KWPII	0.002	18.992	AGC MAVG - calculated
7/13/2015 6:41	0:02	KWPII	0.017	18.965	AGC MAVG - calculated
7/13/2015 6:44	0:29	KWPII	0.956	20.704	AGC MAVG - calculated
7/13/2015 7:19	0:05	KWPII	0.015	20.708	AGC MAVG - calculated
7/13/2015 12:07	0:02	KWPII	0.013	20.574	AGC MAVG - calculated
7/13/2015 12:10	0:03	KWPII	0.013	20.567	AGC MAVG - calculated
7/13/2015 12:15	0:02	KWPII	0.013	20.413	AGC MAVG - calculated
7/13/2015 13:27	0:04	KWPII	0.041	20.284	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 13:34	0:19	KWPII	0.722	20.368	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 14:00	0:52	KWPII	2.733	20.636	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 14:54	0:09	KWPII	0.144	20.505	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 15:06	0:04	KWPII	0.073	20.615	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 15:11	0:22	KWPII	0.422	20.705	AGC MAVG - calculated and Good Engineering and Operating Practices
7/13/2015 19:43	0:17	KWPII	0.843	20.702	AGC MAVG - calculated and Testing
7/13/2015 22:43	0:17	KWPII	0.980	20.708	AGC MAVG - calculated
7/13/2015 23:03	0:08	KWPII	0.181	20.708	AGC MAVG - calculated
7/13/2015 23:28	0:02	KWPII	0.012	20.708	AGC MAVG - calculated
7/13/2015 23:31	0:12	KWPII	0.227	20.708	AGC MAVG - calculated
7/13/2015 23:46	0:07	KWPII	0.099	20.708	AGC MAVG - calculated
7/14/2015 0:25	1:56	KWPII	32.796	20.708	AGC MAVG - calculated
7/14/2015 0:43	0:05	AWE	0.088	20.957	AGC MAVG - calculated
7/14/2015 0:49	0:09	AWE	0.101	19.970	AGC MAVG - calculated, AGC MAVG - entered, and AGC MAVG - entered - Maintaining Regulating Reserves
7/14/2015 0:59	0:34	AWE	1.658	20.697	AGC MAVG - entered - Maintaining Regulating Reserves, AGC MAVG - calculated, AGC MAVG - entered - Maintaining Regulating Reserves, and AGC MAVG - calculated
7/14/2015 1:39	0:02	AWE	0.018	16.023	AGC MAVG - calculated
7/14/2015 1:42	0:24	AWE	1.004	18.773	AGC MAVG - calculated, AGC MAVG - entered, and AGC MAVG - entered - Maintaining Regulating Reserves
7/14/2015 2:07	0:04	AWE	0.087	16.747	AGC MAVG - entered - Maintaining Regulating Reserves and AGC MAVG - calculated
7/14/2015 2:22	2:36	KWPII	49.971	20.688	AGC MAVG - calculated, AGC MAVG - entered, AGC MAVG - entered - Maintaining Regulating Reserves, and AGC MAVG -
7/14/2015 2:28	1:35	AWE	8.539	20.667	AGC MAVG - entered - Maintaining Regulating Reserves
7/14/2015 4:06	0:40	AWE	2.119	18.963	AGC MAVG - entered - Maintaining Regulating Reserves
7/14/2015 4:48	0:01	AWE	0.010	15.613	AGC MAVG - calculated
7/14/2015 5:00	1:15	KWPII	11.556	20.707	AGC MAVG - calculated
7/14/2015 11:11	0:01	KWPII	0.029	16.919	AGC MAVG - calculated
7/14/2015 11:13	0:01	KWPII	0.026	14.963	AGC MAVG - calculated
7/15/2015 0:40	0:01	KWPII	0.019	9.200	AGC MAVG - calculated
7/15/2015 0:47	0:01	KWPII	0.053	14.407	AGC MAVG - calculated
7/15/2015 0:54	0:18	KWPII	1.474	18.252	AGC MAVG - calculated
7/15/2015 1:19	0:01	KWPII	0.023	13.090	AGC MAVG - calculated
7/15/2015 1:24	0:37	KWPII	5.158	20.060	AGC MAVG - calculated
7/15/2015 2:04	0:02	KWPII	0.095	20.083	AGC MAVG - calculated
7/15/2015 2:07	4:19	KWPII	42.805	20.708	AGC MAVG - calculated, AGC MAVG - entered, AGC MAVG - entered - Excess Energy, and AGC MAVG - calculated
7/15/2015 6:33	0:02	KWPII	0.003	20.152	AGC MAVG - calculated
7/15/2015 6:37	0:01	KWPII	0.012	19.942	AGC MAVG - calculated
7/15/2015 6:43	0:05	KWPII	0.049	20.414	AGC MAVG - calculated
7/15/2015 7:27	0:02	KWPII	0.003	20.552	AGC MAVG - calculated
7/15/2015 7:41	1:02	KWPII	3.374	20.681	AGC MAVG - calculated
7/15/2015 8:46	0:01	KWPII	0.003	17.676	AGC MAVG - calculated
7/15/2015 8:57	0:02	KWPII	0.063	19.197	AGC MAVG - calculated
7/15/2015 9:00	0:15	KWPII	0.652	20.256	AGC MAVG - calculated
7/15/2015 9:33	0:02	KWPII	0.034	18.379	AGC MAVG - calculated
7/15/2015 9:37	1:44	KWPII	9.029	19.913	AGC MAVG - calculated
7/15/2015 11:24	0:02	KWPII	0.028	18.323	AGC MAVG - calculated
7/15/2015 11:31	0:02	KWPII	0.049	17.261	AGC MAVG - calculated
7/15/2015 11:36	0:01	KWPII	0.036	17.049	AGC MAVG - calculated

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Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
7/15/2015 11:39	0:01	KWPII	0.003	17.761	AGC MAVG - calculated
7/15/2015 11:46	0:05	KWPII	0.373	16.107	AGC MAVG - calculated
7/15/2015 11:52	0:01	KWPII	0.020	15.657	AGC MAVG - calculated
7/15/2015 11:58	0:04	KWPII	0.098	17.953	AGC MAVG - calculated
7/15/2015 12:14	0:01	KWPII	0.004	18.009	AGC MAVG - calculated
7/15/2015 12:18	0:01	KWPII	0.000	17.605	AGC MAVG - calculated
7/15/2015 12:28	0:01	KWPII	0.003	18.955	AGC MAVG - calculated and Testing
7/15/2015 12:30	0:14	KWPII	0.725	20.097	AGC MAVG - calculated and Testing
7/15/2015 12:50	0:01	KWPII	0.030	19.527	AGC MAVG - calculated and Testing
7/15/2015 12:52	0:14	KWPII	0.646	19.795	AGC MAVG - calculated
7/15/2015 13:11	0:27	KWPII	1.686	19.994	AGC MAVG - calculated
7/15/2015 13:48	0:01	KWPII	0.021	18.550	AGC MAVG - calculated
7/15/2015 13:51	0:01	KWPII	0.010	18.854	AGC MAVG - calculated
7/15/2015 13:56	0:03	KWPII	0.118	18.950	AGC MAVG - calculated
7/15/2015 14:03	0:06	KWPII	0.123	19.944	AGC MAVG - calculated
7/15/2015 15:51	0:03	KWPII	0.066	16.804	AGC MAVG - calculated
7/15/2015 16:00	0:03	KWPII	0.100	18.425	AGC MAVG - calculated
7/15/2015 16:04	0:02	KWPII	0.045	19.433	AGC MAVG - calculated
7/15/2015 16:10	0:03	KWPII	0.048	19.996	AGC MAVG - calculated
7/15/2015 23:26	0:01	KWPII	0.005	19.532	AGC MAVG - calculated
7/16/2015 1:00	2:05	KWPII	14.839	20.701	AGC MAVG - calculated, AGC MAVG - entered, AGC MAVG - entered - Maintaining Regulating Reserves, and AGC MAVG -
7/16/2015 3:08	0:09	KWPII	0.253	19.944	AGC MAVG - calculated and AGC MAVG - entered
7/16/2015 4:55	0:02	KWPII	0.052	5.415	AGC MAVG - calculated
7/16/2015 8:39	0:01	KWP	0.000	0.004	AGC MAVG - calculated
7/17/2015 2:37	0:01	KWP	0.000	0.006	AGC MAVG - calculated
7/17/2015 10:32	0:01	KWP	0.000	0.018	AGC MAVG - calculated
7/17/2015 15:30	0:07	KWPII	0.190	18.511	AGC MAVG - calculated
7/17/2015 16:32	0:01	KWPII	0.001	20.677	AGC MAVG - calculated
7/17/2015 16:48	0:02	KWPII	0.004	20.503	AGC MAVG - calculated
7/17/2015 16:52	0:01	KWPII	0.007	20.672	AGC MAVG - calculated
7/17/2015 16:55	0:04	KWPII	0.028	20.695	AGC MAVG - calculated
7/17/2015 17:07	0:01	KWPII	0.001	20.629	AGC MAVG - calculated
7/17/2015 17:38	0:02	KWPII	0.001	20.708	AGC MAVG - calculated
7/17/2015 17:42	0:01	KWPII	0.002	20.705	AGC MAVG - calculated
7/17/2015 18:49	0:01	KWPII	0.002	20.646	AGC MAVG - calculated
7/17/2015 18:51	0:01	KWPII	0.001	20.667	AGC MAVG - calculated
7/17/2015 19:00	0:04	KWPII	0.034	20.700	AGC MAVG - calculated
7/17/2015 19:20	0:02	KWPII	0.003	20.689	AGC MAVG - calculated
7/18/2015 0:17	0:04	KWPII	0.019	20.351	AGC MAVG - calculated
7/18/2015 0:24	0:05	KWPII	0.128	20.036	AGC MAVG - calculated
7/18/2015 0:31	0:05	KWPII	0.105	20.348	AGC MAVG - calculated
7/18/2015 0:40	0:09	KWPII	0.350	20.403	AGC MAVG - calculated, AGC MAVG - entered - Maintaining Regulating Reserves, and Operating Conditions on Company's System
7/18/2015 0:50	0:01	KWPII	0.017	19.412	AGC MAVG - calculated
7/18/2015 1:02	0:11	KWPII	0.398	20.277	AGC MAVG - calculated
7/18/2015 1:20	0:06	KWPII	0.212	19.308	AGC MAVG - calculated
7/18/2015 1:29	0:04	KWPII	0.076	19.363	AGC MAVG - calculated
7/18/2015 1:34	0:05	KWPII	0.183	19.238	AGC MAVG - calculated
7/18/2015 1:40	0:10	KWPII	0.382	17.980	AGC MAVG - calculated
7/18/2015 2:52	0:16	KWPII	0.576	19.411	AGC MAVG - calculated
7/18/2015 3:11	0:01	KWPII	0.015	17.043	AGC MAVG - calculated
7/18/2015 3:13	0:01	KWPII	0.016	17.529	AGC MAVG - calculated
7/18/2015 3:16	0:01	KWPII	0.015	16.908	AGC MAVG - calculated
7/18/2015 3:22	0:02	KWPII	0.077	18.381	AGC MAVG - calculated
7/18/2015 3:26	1:03	KWPII	4.812	19.561	AGC MAVG - calculated
7/18/2015 4:30	0:26	KWPII	1.285	19.066	AGC MAVG - calculated
7/18/2015 5:48	1:04	KWPII	3.812	20.638	AGC MAVG - calculated
7/18/2015 9:14	0:06	KWPII	0.055	20.295	AGC MAVG - calculated
7/18/2015 10:08	0:02	KWPII	0.009	19.856	AGC MAVG - calculated
7/18/2015 10:11	0:01	KWPII	0.009	20.233	AGC MAVG - calculated
7/18/2015 10:20	0:03	KWPII	0.006	20.232	AGC MAVG - calculated
7/18/2015 10:28	0:33	KWPII	2.989	20.347	AGC MAVG - entered - Maintaining Regulating Reserves and AGC MAVG - calculated
7/18/2015 11:44	0:08	KWPII	0.263	20.625	AGC MAVG - calculated
7/18/2015 11:55	1:10	KWPII	4.232	20.505	AGC MAVG - calculated
7/18/2015 13:51	0:05	KWPII	0.151	19.939	AGC MAVG - calculated
7/18/2015 13:59	0:05	KWPII	0.149	20.041	AGC MAVG - calculated
7/18/2015 14:05	0:09	KWPII	0.118	20.458	AGC MAVG - calculated
7/18/2015 14:18	0:31	KWPII	2.641	20.470	AGC MAVG - calculated
7/18/2015 14:50	0:05	KWPII	0.273	19.679	AGC MAVG - calculated
7/18/2015 14:56	0:04	KWPII	0.098	19.319	AGC MAVG - calculated
7/18/2015 15:34	0:01	KWPII	0.018	18.907	AGC MAVG - calculated
7/18/2015 23:44	0:06	KWPII	0.122	20.388	AGC MAVG - calculated
7/18/2015 23:54	3:01	KWPII	20.864	20.443	AGC MAVG - calculated
7/19/2015 2:56	0:47	KWPII	2.010	20.295	AGC MAVG - calculated
7/19/2015 3:44	1:21	KWPII	5.727	20.203	AGC MAVG - calculated
7/19/2015 5:19	0:06	KWPII	0.070	19.640	AGC MAVG - calculated
7/19/2015 5:28	0:17	KWPII	0.486	20.147	AGC MAVG - calculated
7/19/2015 5:49	0:01	KWPII	0.021	18.037	AGC MAVG - calculated
7/19/2015 5:52	0:06	KWPII	0.142	20.094	AGC MAVG - calculated
7/19/2015 6:03	0:01	KWPII	0.007	18.674	AGC MAVG - calculated
7/19/2015 6:06	0:01	KWPII	0.013	18.692	AGC MAVG - calculated
7/19/2015 6:41	0:04	KWPII	0.051	18.895	AGC MAVG - calculated
7/19/2015 6:53	0:01	KWPII	0.001	19.841	AGC MAVG - calculated
7/19/2015 6:59	0:06	KWPII	0.176	20.140	AGC MAVG - calculated
7/19/2015 7:36	0:26	KWPII	1.142	20.563	AGC MAVG - calculated
7/19/2015 8:06	0:18	KWPII	0.761	19.891	AGC MAVG - calculated
7/19/2015 8:27	0:03	KWPII	0.028	20.194	AGC MAVG - calculated
7/19/2015 8:33	0:01	KWPII	0.012	19.630	AGC MAVG - calculated
7/19/2015 8:41	0:01	KWPII	0.019	19.127	AGC MAVG - calculated
7/19/2015 10:48	0:01	KWPII	0.006	18.510	AGC MAVG - calculated
7/19/2015 10:52	0:02	KWPII	0.016	18.667	AGC MAVG - calculated
7/19/2015 11:15	0:01	KWPII	0.003	18.520	AGC MAVG - calculated
7/19/2015 11:17	0:03	KWPII	0.067	19.786	AGC MAVG - calculated
7/19/2015 11:27	0:07	KWPII	0.108	19.021	AGC MAVG - calculated
7/19/2015 11:35	0:03	KWPII	0.060	19.259	AGC MAVG - calculated
7/19/2015 13:27	0:01	KWPII	0.001	17.634	AGC MAVG - calculated
7/19/2015 13:29	0:02	KWPII	0.053	18.181	AGC MAVG - calculated
7/19/2015 14:52	0:01	KWPII	0.016	18.601	AGC MAVG - calculated
7/19/2015 14:55	0:02	KWPII	0.030	17.687	AGC MAVG - calculated
7/19/2015 21:52	0:01	AWE	0.000	0.007	AGC MAVG - calculated
7/19/2015 21:57	0:01	AWE	0.000	0.003	AGC MAVG - calculated
7/19/2015 22:15	0:01	AWE	0.000	0.003	AGC MAVG - calculated
7/19/2015 22:17	0:01	AWE	0.000	0.003	AGC MAVG - calculated
7/20/2015 2:00	0:03	KWPII	0.060	13.575	AGC MAVG - calculated
7/20/2015 2:04	0:06	KWPII	0.137	13.817	AGC MAVG - calculated
7/20/2015 2:13	0:01	KWPII	0.030	13.663	AGC MAVG - calculated
7/20/2015 2:16	0:07	KWPII	0.233	13.450	AGC MAVG - calculated
7/20/2015 2:27	0:03	KWPII	0.089	12.040	AGC MAVG - calculated
7/20/2015 3:38	0:06	KWPII	0.123	10.917	AGC MAVG - calculated
7/20/2015 3:45	0:04	KWPII	0.037	10.784	AGC MAVG - calculated
7/20/2015 18:14	0:01	KWP	0.000	0.002	AGC MAVG - calculated
7/20/2015 19:18	0:01	KWP	0.000	0.009	AGC MAVG - calculated
7/22/2015 5:46	0:01	KWP	0.000	0.008	AGC MAVG - calculated
7/22/2015 22:45	0:06	KWPII	0.192	12.775	AGC MAVG - calculated
7/22/2015 22:54	0:06	KWPII	0.288	16.713	AGC MAVG - calculated

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Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
7/22/2015 23:07	0:01	KWPII	0.003	16.213	AGC MAVG - calculated
7/22/2015 23:11	0:05	KWPII	0.141	17.938	AGC MAVG - calculated
7/22/2015 23:20	0:03	KWPII	0.024	17.423	AGC MAVG - calculated
7/22/2015 23:25	0:02	KWPII	0.020	17.745	AGC MAVG - calculated
7/22/2015 23:37	0:04	KWPII	0.059	16.223	AGC MAVG - calculated
7/22/2015 23:44	2:18	KWPII	25.577	20.663	AGC MAVG - calculated
7/23/2015 1:53	0:03	AWE	0.029	9.820	AGC MAVG - calculated
7/23/2015 2:04	0:32	KWPII	9.213	20.449	AGC MAVG - calculated
7/23/2015 2:21	0:02	AWE	0.043	8.087	AGC MAVG - calculated
7/23/2015 2:24	0:01	AWE	0.009	7.457	AGC MAVG - calculated
7/23/2015 2:39	0:45	KWPII	5.768	20.407	AGC MAVG - calculated
7/23/2015 3:29	0:34	KWPII	3.050	20.436	AGC MAVG - entered - Maintaining Regulating Reserves, Operating Conditions on Company's System, and AGC MAVG - calculated
7/23/2015 4:05	1:40	KWPII	10.279	20.515	AGC MAVG - calculated
7/23/2015 6:50	0:01	KWPII	0.004	19.838	AGC MAVG - calculated
7/23/2015 6:55	0:04	KWPII	0.048	20.515	AGC MAVG - calculated
7/23/2015 7:00	0:03	KWPII	0.062	20.569	AGC MAVG - calculated
7/23/2015 7:05	0:03	KWPII	0.029	20.612	AGC MAVG - calculated
7/23/2015 7:13	0:02	KWPII	0.008	20.508	AGC MAVG - calculated
7/23/2015 8:29	0:06	KWPII	0.066	20.609	AGC MAVG - calculated
7/23/2015 9:18	0:12	KWPII	0.504	20.674	AGC MAVG - calculated
7/23/2015 9:55	0:02	KWPII	0.006	20.705	AGC MAVG - calculated
7/23/2015 10:15	0:02	KWPII	0.019	20.625	AGC MAVG - calculated
7/23/2015 11:43	0:12	KWPII	0.487	20.631	AGC MAVG - calculated
7/23/2015 11:57	0:23	KWPII	1.206	20.612	AGC MAVG - calculated, AGC MAVG - entered, AGC MAVG - entered - Maintaining Regulating Reserves, and AGC MAVG -
7/23/2015 12:22	0:08	KWPII	0.404	20.624	AGC MAVG - calculated
7/23/2015 12:32	0:11	KWPII	0.430	20.667	AGC MAVG - calculated
7/23/2015 12:49	0:02	KWPII	0.005	20.626	AGC MAVG - calculated
7/23/2015 12:53	0:06	KWPII	0.139	20.547	AGC MAVG - calculated
7/23/2015 13:00	0:05	KWPII	0.144	20.499	AGC MAVG - calculated
7/23/2015 13:06	0:10	KWPII	0.587	20.608	AGC MAVG - calculated
7/23/2015 13:22	0:02	KWPII	0.004	20.497	AGC MAVG - calculated
7/23/2015 13:25	0:01	KWPII	0.016	20.298	AGC MAVG - calculated
7/23/2015 13:27	0:02	KWPII	0.010	19.785	AGC MAVG - calculated
7/23/2015 13:30	0:03	KWPII	0.046	20.221	AGC MAVG - calculated
7/23/2015 13:34	0:03	KWPII	0.082	20.559	AGC MAVG - calculated
7/23/2015 13:39	0:02	KWPII	0.032	20.557	AGC MAVG - calculated
7/23/2015 13:45	0:01	KWPII	0.004	20.411	AGC MAVG - calculated
7/23/2015 13:51	0:06	KWPII	0.044	20.448	AGC MAVG - calculated
7/23/2015 13:58	0:03	KWPII	0.013	20.519	AGC MAVG - calculated
7/23/2015 22:58	0:02	KWPII	0.004	20.703	AGC MAVG - calculated
7/23/2015 23:19	0:17	KWPII	0.988	20.703	AGC MAVG - calculated
7/24/2015 0:20	0:01	KWPII	0.000	20.687	AGC MAVG - calculated
7/24/2015 0:22	0:01	KWPII	0.000	20.686	AGC MAVG - calculated
7/24/2015 0:27	2:25	KWPII	24.536	20.708	AGC MAVG - calculated
7/24/2015 2:37	0:07	AWE	0.115	17.900	AGC MAVG - calculated
7/24/2015 2:54	1:45	KWPII	34.458	20.708	AGC MAVG - calculated
7/24/2015 2:57	0:15	AWE	0.731	19.467	AGC MAVG - calculated
7/24/2015 3:13	0:42	AWE	2.567	21.000	AGC MAVG - calculated
7/24/2015 4:13	0:06	AWE	0.114	17.433	AGC MAVG - calculated
7/24/2015 4:24	0:02	AWE	0.026	17.720	AGC MAVG - calculated
7/24/2015 4:41	1:07	KWPII	9.413	20.708	AGC MAVG - calculated
7/24/2015 5:52	0:03	KWPII	0.034	20.708	AGC MAVG - calculated
7/24/2015 8:19	0:02	KWPII	0.011	20.682	AGC MAVG - calculated
7/24/2015 8:25	0:08	KWPII	0.201	20.708	AGC MAVG - calculated
7/24/2015 10:05	0:09	KWPII	0.082	20.700	AGC MAVG - calculated
7/24/2015 10:15	0:03	KWPII	0.026	20.691	AGC MAVG - calculated
7/24/2015 10:28	0:06	KWPII	0.135	20.680	AGC MAVG - calculated
7/24/2015 10:38	0:01	KWPII	0.005	20.608	AGC MAVG - calculated
7/24/2015 10:45	0:06	KWPII	0.142	20.667	AGC MAVG - calculated
7/24/2015 10:52	0:07	KWPII	0.156	20.688	AGC MAVG - calculated
7/24/2015 11:08	0:04	KWPII	0.072	20.679	AGC MAVG - calculated
7/24/2015 11:14	0:01	KWPII	0.012	20.690	AGC MAVG - calculated
7/24/2015 11:22	0:09	KWPII	0.270	20.670	AGC MAVG - calculated
7/24/2015 12:19	0:04	KWPII	0.018	20.591	AGC MAVG - calculated
7/24/2015 13:35	0:03	KWPII	0.036	20.435	AGC MAVG - calculated
7/24/2015 13:49	0:01	KWPII	0.003	20.579	AGC MAVG - calculated
7/24/2015 22:13	0:03	KWPII	0.108	19.394	AGC MAVG - calculated
7/25/2015 1:11	0:01	AWE	0.000	0.007	AGC MAVG - calculated
7/25/2015 11:47	0:01	KWPII	0.003	5.598	AGC MAVG - calculated and Testing
7/28/2015 10:25	0:01	KWP	0.000	0.002	AGC MAVG - calculated
7/29/2015 16:33	0:03	KWPII	0.208	12.202	AGC MAVG - calculated
7/29/2015 16:59	0:02	KWPII	0.034	14.699	AGC MAVG - calculated
7/29/2015 17:02	0:02	KWPII	0.038	16.430	AGC MAVG - calculated
7/29/2015 17:05	0:01	KWPII	0.000	16.696	AGC MAVG - calculated
7/29/2015 17:07	0:04	KWPII	0.055	18.090	AGC MAVG - calculated
7/29/2015 17:20	0:04	KWPII	0.073	17.548	AGC MAVG - calculated
7/29/2015 22:58	0:25	KWPII	1.200	20.539	AGC MAVG - calculated
7/29/2015 23:27	0:06	KWPII	0.052	20.435	AGC MAVG - calculated
7/29/2015 23:47	4:17	KWPII	68.651	20.708	AGC MAVG - calculated
7/30/2015 0:23	0:04	AWE	0.151	21.000	AGC MAVG - calculated
7/30/2015 1:18	0:04	AWE	0.026	20.990	AGC MAVG - calculated
7/30/2015 1:23	0:01	AWE	0.006	20.647	AGC MAVG - calculated
7/30/2015 1:50	0:02	AWE	0.003	21.000	AGC MAVG - calculated
7/30/2015 1:53	0:01	AWE	0.000	21.000	AGC MAVG - calculated
7/30/2015 1:56	0:02	AWE	0.016	21.000	AGC MAVG - calculated
7/30/2015 1:59	0:35	AWE	0.395	21.000	AGC MAVG - calculated
7/30/2015 2:45	0:20	AWE	0.564	20.747	AGC MAVG - calculated
7/30/2015 3:07	0:28	AWE	1.141	21.000	AGC MAVG - calculated
7/30/2015 3:39	0:03	AWE	0.038	20.497	AGC MAVG - calculated
7/30/2015 3:44	0:01	AWE	0.002	19.063	AGC MAVG - calculated
7/30/2015 3:49	0:01	AWE	0.005	19.813	AGC MAVG - calculated
7/30/2015 3:51	0:03	AWE	0.026	18.890	AGC MAVG - calculated
7/30/2015 4:05	1:22	KWPII	18.844	20.408	AGC MAVG - calculated
7/30/2015 4:14	0:01	AWE	0.003	19.613	AGC MAVG - calculated
7/30/2015 5:30	0:01	KWPII	0.013	18.654	AGC MAVG - calculated
7/30/2015 5:32	0:01	KWPII	0.018	18.367	AGC MAVG - calculated
7/30/2015 5:35	0:02	KWPII	0.064	18.423	AGC MAVG - calculated
7/30/2015 5:39	0:01	KWPII	0.016	13.528	AGC MAVG - calculated
7/30/2015 5:55	0:02	KWPII	0.082	15.626	AGC MAVG - calculated
7/30/2015 6:36	0:38	KWPII	2.677	20.629	AGC MAVG - calculated
7/30/2015 7:15	0:05	KWPII	0.137	19.126	AGC MAVG - calculated
7/30/2015 7:21	0:09	KWPII	0.233	20.219	AGC MAVG - calculated
7/30/2015 7:31	0:09	KWPII	0.193	20.581	AGC MAVG - calculated
7/30/2015 7:44	0:02	KWPII	0.061	19.484	AGC MAVG - calculated
7/30/2015 9:01	0:03	KWPII	0.023	19.696	AGC MAVG - calculated
7/30/2015 9:06	0:01	KWPII	0.002	19.924	AGC MAVG - calculated
7/30/2015 9:08	0:05	KWPII	0.084	20.203	AGC MAVG - calculated
7/30/2015 11:07	0:03	KWPII	0.059	12.604	AGC MAVG - calculated
7/30/2015 12:28	0:01	KWPII	0.010	13.112	AGC MAVG - calculated
7/30/2015 13:05	0:02	KWPII	0.020	18.752	AGC MAVG - calculated
7/30/2015 13:12	0:01	KWPII	0.019	18.762	AGC MAVG - calculated
7/30/2015 22:57	0:06	KWPII	0.076	20.697	AGC MAVG - calculated
7/30/2015 23:37	0:19	KWPII	0.698	20.708	AGC MAVG - calculated
7/31/2015 0:02	0:07	KWPII	0.157	20.708	AGC MAVG - calculated

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Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
7/31/2015 0:14	0:07	KWPII	0.102	20.708	AGC MAVG - calculated
7/31/2015 1:01	0:04	KWPII	0.051	20.688	AGC MAVG - calculated
7/31/2015 1:08	0:07	KWPII	0.078	20.708	AGC MAVG - calculated
7/31/2015 5:09	0:03	KWPII	0.029	20.708	AGC MAVG - calculated
7/31/2015 5:15	0:01	KWPII	0.001	20.708	AGC MAVG - calculated
7/31/2015 5:17	0:03	KWPII	0.028	20.708	AGC MAVG - calculated
7/31/2015 5:32	0:15	KWPII	0.440	20.708	AGC MAVG - calculated
7/31/2015 6:30	0:01	AWE	0.000	0.007	AGC MAVG - calculated
7/31/2015 7:57	0:10	KWPII	0.244	20.708	AGC MAVG - calculated
7/31/2015 8:11	1:02	KWPII	4.518	20.708	AGC MAVG - calculated
7/31/2015 9:15	0:03	KWPII	0.013	20.492	AGC MAVG - calculated
7/31/2015 11:00	0:04	KWPII	0.016	20.702	AGC MAVG - calculated
7/31/2015 11:16	0:02	KWPII	0.005	20.665	AGC MAVG - calculated
7/31/2015 11:32	0:14	KWPII	0.118	20.661	AGC MAVG - calculated
7/31/2015 11:47	0:02	KWPII	0.005	20.501	AGC MAVG - calculated
7/31/2015 11:50	0:01	KWPII	0.000	20.580	AGC MAVG - calculated
7/31/2015 11:57	0:02	KWPII	0.010	20.680	AGC MAVG - calculated
7/31/2015 12:00	0:03	KWPII	0.016	20.692	AGC MAVG - calculated
7/31/2015 12:05	0:08	KWPII	0.052	20.668	AGC MAVG - calculated
7/31/2015 12:48	0:02	KWPII	0.003	20.684	AGC MAVG - calculated
7/31/2015 23:59	0:01	KWPII	0.002	20.708	AGC MAVG - calculated

Notes:

- Curtailment for Kaheawa Wind Power ("KWP"), Makila Hydroelectric ("MH"), AAAAA Rent-A-Space Maui LTD ("5A"), Bioreal Solar, LLC ("BS"), Auwahi Wind Energy ("AWE"), and Kaheawa Wind Power II ("KWPII") may now be controlled by Maui Electric's Automatic Generation Control System ("AGC") or a Maui Electric operator-entered curtailment limit. The AGC curtailment control automatically calculates the amount of Maximum Allowable Variable Generation ("MAVG") that Maui Electric can accept into the Maui system, based on the system current available variable generation ("CAVG"), regulating reserve down requirement ("RRDR"), and available regulating reserve down ("ARRD"). Thus, the AGC MAVG - calculated is equal to CAVG less (RRDR less ARRD). Additionally, the AGC curtailment control allows the Maui Electric operator to enter an AGC MAVG value. The AGC curtailment control will employ the lesser of the AGC MAVG - calculated and AGC MAVG - entered values in the control logic.
- The Estimated Curtailed MWH and Peak MW Curtailed are calculated with information provided by AWE, KWP, and KWPII. Maui Electric does not make any representation as to its accuracy.
- The data to calculate the Estimated Curtailed MWH and Peak MW Curtailed is not provided by 5A, BS, or MH.
- Curtailment signals sent to 5A or BS during nighttime hours are not recorded as curtailment events because no energy generation is possible during that time.

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Start Date/Time	Stop Date/Time	Duration (h:mm)	IPP Curtailed	Estimated MWH Curtailed	Peak MW Curtailed	Reasons for Curtailment
7/1/2015 5:00	7/1/2015 6:12	1:13	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/1/2015 6:15	7/1/2015 6:16	0:02	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/1/2015 16:38	7/1/2015 19:59	3:22	LSR	Data is not available	Data is not available	Testing
7/2/2015 5:00	7/2/2015 8:58	3:59	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/2/2015 18:41	7/2/2015 19:59	1:19	LSR	Data is not available	Data is not available	Testing
7/3/2015 5:00	7/3/2015 6:13	1:14	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/3/2015 18:54	7/3/2015 19:59	1:06	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/4/2015 5:00	7/4/2015 6:10	1:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/4/2015 18:48	7/4/2015 18:48	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/4/2015 18:53	7/4/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/5/2015 5:00	7/5/2015 6:10	1:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/5/2015 18:53	7/5/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/6/2015 5:00	7/6/2015 6:10	1:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/6/2015 18:53	7/6/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/7/2015 5:00	7/7/2015 6:11	1:12	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/7/2015 18:38	7/7/2015 19:59	1:22	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/8/2015 5:00	7/8/2015 6:17	1:18	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/8/2015 18:53	7/8/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/9/2015 5:00	7/9/2015 6:15	1:16	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/9/2015 18:52	7/9/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/10/2015 5:00	7/10/2015 6:28	1:29	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/10/2015 18:32	7/10/2015 18:38	0:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/10/2015 18:49	7/10/2015 18:49	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/10/2015 18:53	7/10/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/11/2015 5:00	7/11/2015 6:02	1:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/11/2015 6:34	7/11/2015 6:40	0:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/11/2015 18:41	7/11/2015 19:59	1:19	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/12/2015 5:00	7/12/2015 6:13	1:14	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/12/2015 17:00	7/12/2015 17:10	0:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/12/2015 17:22	7/12/2015 17:36	0:15	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/12/2015 18:57	7/12/2015 19:59	1:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/13/2015 5:00	7/13/2015 6:34	1:35	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/13/2015 18:35	7/13/2015 19:59	1:25	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 5:00	7/14/2015 6:13	1:14	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 6:17	7/14/2015 6:19	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 6:24	7/14/2015 6:24	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 6:33	7/14/2015 6:34	0:02	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 6:44	7/14/2015 6:47	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 17:44	7/14/2015 18:12	0:29	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 18:18	7/14/2015 18:22	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/14/2015 18:53	7/14/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/15/2015 5:00	7/15/2015 6:14	1:15	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/15/2015 6:16	7/15/2015 6:30	0:15	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/15/2015 19:00	7/15/2015 19:59	1:00	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/16/2015 5:00	7/16/2015 6:17	1:18	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/16/2015 18:39	7/16/2015 19:59	1:21	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/17/2015 5:00	7/17/2015 6:39	1:40	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/17/2015 18:50	7/17/2015 19:59	1:10	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/18/2015 5:00	7/18/2015 6:53	1:54	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/18/2015 18:46	7/18/2015 18:49	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/18/2015 18:53	7/18/2015 19:59	1:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/19/2015 5:00	7/19/2015 6:17	1:18	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/19/2015 18:51	7/19/2015 19:59	1:09	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/20/2015 5:00	7/20/2015 6:14	1:15	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/20/2015 18:52	7/20/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/21/2015 5:00	7/21/2015 6:21	1:22	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/21/2015 18:37	7/21/2015 19:59	1:23	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/22/2015 5:00	7/22/2015 6:16	1:17	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/22/2015 18:50	7/22/2015 19:59	1:10	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/23/2015 5:00	7/23/2015 6:00	1:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/23/2015 18:52	7/23/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/24/2015 5:00	7/24/2015 6:17	1:18	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/24/2015 18:51	7/24/2015 19:59	1:09	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/25/2015 5:00	7/25/2015 6:16	1:17	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/25/2015 18:18	7/25/2015 18:20	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/25/2015 18:25	7/25/2015 18:26	0:02	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/25/2015 18:32	7/25/2015 19:59	1:28	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/26/2015 5:00	7/26/2015 6:16	1:17	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/26/2015 18:27	7/26/2015 18:27	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/26/2015 18:31	7/26/2015 19:59	1:29	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/27/2015 5:00	7/27/2015 6:17	1:18	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/27/2015 18:34	7/27/2015 18:38	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/27/2015 18:52	7/27/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/28/2015 5:00	7/28/2015 6:33	1:34	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/28/2015 18:52	7/28/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/29/2015 5:00	7/29/2015 6:20	1:21	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/29/2015 18:52	7/29/2015 19:59	1:08	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/30/2015 5:00	7/30/2015 5:02	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/30/2015 5:24	7/30/2015 6:17	0:54	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/30/2015 18:46	7/30/2015 19:59	1:14	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/31/2015 5:00	7/31/2015 6:18	1:19	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
7/31/2015 18:49	7/31/2015 19:59	1:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices

Notes:

On June 27, 2012, Maui Electric notified LSR that although LSR has not operated in compliance with the revised ramp rate of 360 kW/minute, Maui Electric would conditionally allow LSR to operate at the allowed capacity of 1.2 MW while the Maui Electric-Lanai Diesel Operator was in the control room.

LSR possible output data is not available. Therefore, Maui Electric assumes LSR is curtailed if the LSR curtailment set point is less than 1,200 kW and LSR's output is within 50 kW of the curtailment set point.

Hawai`i Electric Light Company Curtailment Report July 2015

Start Date/Time	MW output prior to start of curtailment	End Date/Time	MW output after curtailment released[1]	Reason for Curtailment
07/28/15 06:50	17.8 MW	07/28/15 09:20	9.9 MW	Tawhiri curtailed - switching 9600 line.
07/28/15 14:43	17.8 MW	07/28/15 15:17	10.0 MW	Tawhiri curtailed - switching 9600 line.

[1] The MW output values are taken soon after curtailment is released by Hawai'i Electric Light and may not reflect their full output depending on ramp rate for the facility. The wind farms generally return immediately to full available levels, whereas PGV and Wailuku may take longer to return to scheduled or full available output levels.